APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/696,052	10/25/2000	Gerard Chauvel	TIF-29339	3869

23494   7590   08/15/2003

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EXAMINER
CONNOLLY, MARK A

ART UNIT	PAPER NUMBER
2185	

DATE MAILED: 08/15/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/696,052	CHAUVEL ET AL.
	Examiner	Art Unit
	Mark Connolly	2185

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period f r Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on _25 October 2000_ .

2a) ☐ This action is **FINAL.**   2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) _1-22_ is/are pending in the application.

     4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) _1-8, 10-19 and 21-22_ is/are rejected.

7) ☒ Claim(s) _9 and 20_ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.

     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.

     If approved, corrected drawings are required in reply to this Office action.

12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

     a) ☐ All b) ☐ Some * c) ☒ None of:

         1. ☒ Certified copies of the priority documents have been received.

         2. ☐ Certified copies of the priority documents have been received in Application No. _____ .

         3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage
application from the International Bureau (PCT Rule 17.2(a)).

     * See the attached detailed Office action for a list of the certified copies not received.

14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

     a) ☐ The translation of the foreign language provisional application has been received.

15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)	4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)	5) ☐ Notice of Informal Patent Application (PTO-152)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _4_ .	6) ☐ Other: .

DETAILED ACTION

Claim Objections

1.   Claim 1 is objected to because of the following informalities: the "." at the end of claim

1 does not appear directly after the last word of the claim. Appropriate correction is required.

Claim Rejections - 35 USC § 102

> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed
> in the United States before the invention by the applicant for patent or (2) a patent granted on an application for
> patent by another filed in the United States before the invention by the applicant for patent, except that an
> international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this
> subsection of an application filed in the United States only if the international application designated the United
> States and was published under Article 21(2) of such treaty in the English language.

2.   Claims 1-2, 5-7, 10-13, 16-18 and 21-22 are rejected under 35 U.S.C. 102(e) as being

anticipated by Jimbo et al [Jimbo] US Pat No 6173408.

3.   Referring to claim 1, Jimbo teaches the invention substantially including:

a.   calculating consumption information based on probabilistic values for activities

associated with the tasks [col. 8 lines 1-4 and fig. 17].

b.   executing the tasks on said plurality of processing modules responsive to said

consumption information [col. 8 lines 4-8]. The instructions found in fig. 17 are

interpreted as tasks. It is further interpreted that as long as the consumption information

does not cause the HOLD signal to be generated, the tasks will be executed.

4.   Referring to claim 2, Jimbo teaches monitoring actual activity occurrences in processing

modules and modifying the execution of the tasks based on said monitoring step [col. 10 lines 1-

50 and figs. 17 and 18]. In summary, predicted power consumption values for the instructions

being executed and the instructions to be executed are added together to determine a total power

consumption value. If this value exceeds a maximum power consumption level, then a HOLD

signal is generated to suspend any further instructions from being executed until a time when it

has been determined that the instructions can be executed while still keeping the total power

consumption level at or below the maximum power consumption level.

5.   Referring to claim 5, Jimbo teaches:

        a.   generating a task allocation scenario [col. 10 lines 38-44]. The system keeps a list

        of all running instructions and incorporates the next instruction to be executed.

        b.   estimating the activities for task allocation scenario [col. 10 lines 38-44 and fig.

        17]. The system estimates both the number of execution cycles of each instruction as

        well as a predicted power consumption for each instruction.

        c.   computing the consumption associated with said activities [col. 10 lines 38-44].

        The system adds up all predicted power consumption values for each instruction in order

        to compare the total value to a maximum allowable power level.

5.   Referring to claim 6, Jimbo teaches receiving an instruction and its corresponding

predicted power consumption and number of execution cycles [col. 9 lines 65-67, col. 10 lines

12-44 and fig. 17]. The instruction is interpreted as a task list containing one task and the

predicted power consumption and number of execution cycles associated with the instruction,

which is stored in power consumption table 508, is interpreted as a task model describing the

tasks.

6.   Referring to claim 7, Jimbo teaches a predicted power consumption, which as established

above, is interpreted to be part of a task model [fig. 17].

7.   Referring to claims 10 and 11, Jimbo teaches computing the power consumption associated with the activities [col. 10 lines 38-44 and fig. 17]. it is interpreted that energy consumption must be computed because *power = energy/time*.

8.   Referring to claim 12, Jimbo teaches the invention substantially including:

a.   one or more processing modules for executing a plurality of tasks, said processing subsystems executing a power management function [col. 9 line 65 – col. 10 line 5 and fig. 18]. The instructions sent to the processor are interpreted as the plurality of tasks.

b.   calculating consumption information based on probabilistic values for activities associated with the tasks [col. 8 lines 1-4 and fig. 17].

c.   controlling the execution of the tasks on said processing modules responsive to said consumption information [col. 8 lines 4-8]. The instructions found in fig. 17 are interpreted as tasks. It is further interpreted that as long as the consumption information does not cause the HOLD signal to be generated, the tasks will be executed.

9.   Referring to claims 13, 16-18 and 21-22, these are rejected on the same basis as set forth hereinabove. Jimbo teaches the method and therefore teaches the device performing the method.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10.   Claims 3 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jimbo as

applied to claims 1-2, 5-8, 10-13, 16-19 and 21-22 and further in view of Kling et al [Kling] US

Pat No 6367023.

11.   Referring to claim 3, Jimbo teaches monitoring power consumption and preventing the

consumption from exceeding a maximum consumption limit [col. 10 lines 31-50]. Jimbo does

not explicitly teach that this limiting of power is related to providing maximum performance

within thermal constraints. In summary, Jimbo does not teach monitoring the power

consumption to prevent overheating of the processing modules. Kling teaches monitoring power

consumption to prevent overheating a processor [col. 2 lines 55-62]. It would have been obvious

to one of ordinary skill at the time of the invention to use the power consumption information of

Jimbo to prevent overheating of the processing modules because it provides an efficient way to

prevent overheating in processors which can occur when running a CPU at maximum

performance which results in high power consumption as taught by Kling.

12.   Referring to claim 14, this is rejected on the same basis as set forth hereinabove. The

Jimbo-Kling system teaches the method and therefore teaches the device performing the method.

13.   Claims 4 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jimbo as

applied to claims 1-2, 5-8, 10-13, 16-19 and 21-22 and further in view of Driscoll et al [Driscoll]

US Pat No 3593300.

14.   Referring to claim 4, Jimbo does not explicitly teach using the consumption information

in order to execute the tasks using the lowest possible energy consumption. Rather, Jimbo

executes based on the order in which they were received. By doing this though, unnecessary

wait periods occur when an instruction with a high power consumption is stalled until other instructions finish executing because otherwise the power consumption level would exceed the maximum power consumption threshold. Driscoll teaches that tasks can be executed based on a power index where the tasks with the lowest power index can be executed first [abstract and col. 3 lines 64-68]. The power index is interpreted as consumption information. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the Jimbo system to execute instructions based on lowest power consumption if possible, because it would reduce the amount of waiting which occurs when an instruction with high power consumption is to be executed. In summary, Jimbo demonstrates that when instructions with high power consumption are executing, less power is available for other instructions to use in order to execute. In col. 10 lines 38-44, the VIF instruction is executing while the DCT instruction is ready to execute. Because the two cannot execute simultaneously, the HOLD signal is asserted thus causing the system to stall until the VIF instruction completes its execution. This stall is inefficient because the system can handle instructions adding up to 80 power consumption units. Because the VIF command has a power consumption of 45, the system still has 35 power consumption units to budget toward executing other instructions rather than wasting them in a stall condition. By executing instructions with less power consumption, some of that 35 power consumption units could be used to perform other instructions.

15.   Referring to claim 15, this is rejected on the same basis as set forth hereinabove. The Jimbo-Driscoll system teaches the method and therefore teaches the device performing the method.

16.   Claims 8 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jimbo as applied to claims 1-2, 5-8, 10-13, 16-19 and 21-22 and further in view of Buerkle et al [Buerkle] US Pat No 5099421.

17.   Referring to claim 8, Jimbo does not explicitly teach that the tasks have priorities associated with them. In summary, Jimbo does not explicitly teach that the instructions to be executed have priorities associated with them. Buerkle expressly teaches that instructions have priorities associated with them [col. 5 lines 62-68]. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the Jimbo system to associate priorities with the instructions to be executed because it would provide a means to resolve conflicts which could arise between multiple instructions as taught by Buerkle.

18.   Referring to claim 19, this is rejected on the same basis as set forth above. The Jimbo-Buerkle system teaches the method and therefore teaches the device performing the method.

Allowable Subject Matter

19.   Claims 9 and 20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

20.   The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

    a.   Jap Pat No. 08101777 to Ide et al. This teaches selecting instructions to execute based on which instructions will minimize power consumption.
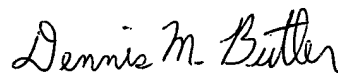
b.   Jap Pat No 10040144 to Kageshima. This teaches estimating the power

consumption of instructions.

c.   Jap Pat No 11203145 to Morikawa. This teaches out-of-order instruction

processing which processes instructions which are less resource intensive before those

instructions which require more resources.

d.   Patterson and Hennesy teach that in-order execution of instructions is inefficient

because during a stall condition with an instruction, no later instructions can be processed

until the stall is finished whereas out-of-order processing eliminates this problem.

21.   Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Mark Connolly whose telephone number is (703) 305-7849. The

examiner can normally be reached on M-F 8AM-5PM (except every first Friday).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Thomas C Lee can be reached on (703) 305-9717. The fax phone numbers for the

organization where this application or proceeding is assigned are (703) 746-7239 for regular

communications and (703) 746-7238 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding

should be directed to the receptionist whose telephone number is (703) 305-3900.

Mark Connolly
Examiner
Art Unit 2185

Dennis M. Butler
Primary Examiner

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August 11, 2003